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PRESSURE-REGULATING VALVE, AUTOMATIC-COOKING PACKAGE HAVING SAID  
PRESSURE-REGULATING VALVE, AND FOOD ARTICLE PACKED IN SAID  
AUTOMATIC-COOKING PACKAGE

[Atsuryoku chouseiben, gai atsuryokuchouseiben wo yuusuru jidouchouriyō  
pakkeji, oyobi gai jidouchouriyō pakkeji de housou sareta inshokuhin]

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[Claims]

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[Claim 1] An automatic-cooking package characterized by comprising a flexible container having a hole in at least one location and a sheet-like pressure-regulating valve adhered so as to block the above-mentioned hole and by the above-mentioned sheet-like pressure-regulating valve opening when the pressure inside the above-mentioned flexible container reaches a certain level or higher.

[Claim 2] With respect to a pressure-regulating valve attached to a flexible container having a hole in at least one location, a pressure-regulating valve characterized by said pressure-regulating valve consisting of a flexible sheet and an adhesive applied to one side of said flexible sheet, by the above-mentioned flexible sheet having an adhesive-free part at the center of the above-mentioned one side, and by said adhesive-free part being noncircular.

[Claim 3] A pressure-regulating valve of Claim 2 in which the above-mentioned adhesive-free part is an isosceles triangle having an apex angle of 60° or less.

[Claim 4] With respect to a pressure-regulating valve attached to a flexible container having a hole in at least one location, a pressure-regulating valve characterized by said pressure-regulating valve consisting of a flexible sheet, an adhesive applied to one side of said flexible sheet, and a noncircular sheet piece attached to the center part of one side.

[Claim 5] A pressure-regulating valve of Claim 4 in which the

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\* Numbers in the margin indicate pagination in the foreign text.

above-mentioned sheet piece is an isosceles triangle having an apex angle of 60° or less.

[Claim 6] With respect to a pressure-regulating valve attached to a flexible container having a hole in at least one location, a pressure-regulating valve characterized by said pressure-regulating valve consisting of a flexible sheet, an adhesive applied to one side of said flexible sheet, and a thread piece attached to the center part of one side.

[Claim 7] A food article packed in an automatic-cooking package characterized by: consisting of a first package which is equipped with a flexible container having a hole in one least one location and a sheet-like pressure-regulating valve adhered so as to block the above-mentioned hole and in which the above-mentioned sheet-like pressure-regulating valve opens when the pressure inside the above-mentioned flexible container has reached a certain level or higher and a second package which is equipped with a flexible container having a hole in at least one location and a sheet-like pressure-regulating valve adhered so as to block the above-mentioned hole and in which the above-mentioned sheet-like pressure-regulating valve opens when the pressure inside the above-mentioned flexible container has reached a certain level or higher; said first package having a cooking solution sealed in it; and the above-mentioned second package having a food item and the above-mentioned first package sealed in it.

[Claim 8] A food article packed in an automatic-cooking package characterized by an ice piece and a frozen food item being sealed in a

package which comprises a flexible container having a hole in at least one location and a sheet-like pressure-regulating valve adhered so as to block the above-mentioned hole and in which the above-mentioned sheet-like pressure-regulating valve opens when the pressure inside the above-mentioned flexible container has reached a certain level or higher.

[Claim 9] A food article which is packed in an automatic-cooking package of Claim 8 and in which the above-mentioned ice piece contains a seasoning.

[Claim 10] A food article packed in an automatic-cooking package characterized by: consisting of a first package which is equipped with a flexible container having a hole in one least one location and a sheet-like pressure-regulating valve adhered so as to block the above-mentioned hole and in which the above-mentioned sheet-like pressure-regulating valve opens when the pressure inside the above-mentioned flexible container has reached a certain level or higher and a second package which is equipped with a flexible container having a hole in at least one location and a sheet-like pressure-regulating valve adhered so as to block the above-mentioned hole and in which the above-mentioned sheet-like pressure-regulating valve opens when the pressure inside the above-mentioned flexible container has reached a certain level or higher; said first package having a non-freezing seasoning sealed in it; and the above-mentioned second package having a frozen food item, an ice piece, and the above-mentioned first package sealed in it.

[Detailed Explanation of the Invention]

[0001]

[Field of Industrial Application] The present invention pertains to

automatic-cooking packages which are packages for food articles provided with the functions of cooking tools. The present invention also pertains to pressure-regulating valves utilized for the above-mentioned automatic-cooking packages. The present invention also pertains to food articles packed in the above-mentioned automatic-cooking packages.

[0002]

[Related Art] Functions required of packages for food articles vary depending on the types of the food articles, but functions generally required are: basic functions such as packaging, delivery, storage, preservation, and freshness retention of food articles; a product display function; a demand increasing function by which the sales are promoted by means of a visual appeal; and a product advertising and promoting function. If the food articles are perishable items such as fishes or meats, the perishable items are taken out of the packages after being brought back home and then become cooked by means of cooking tools, such as a pan or frying pan. The packages are normally disposed of afterwards. If the food articles are seasoned frozen articles or processed articles such as retort articles, they are cooled by using a heat-generating cooking apparatus such as a microwave oven. Also in this case, the packages are normally disposed of afterwards.

[0003]

[Problems that the Invention is to Solve] From the perspective of the food article consumers, conventional packages are for simply packaging the food articles. Although there are some food articles that can be cooled while packaged, it is usually necessary to make holes in the packages

or transfer the food articles to separate dishes, such as plates, in order to avoid rupture, etc. of the packages. In this manner, conventional packages do not function beyond the bounds of simple packages for food articles.

[0004] The present invention was completed for the purpose of providing a food package with the function of a cooking tool while retaining /3 its conventional functions. The purpose of the invention is to supply an automatic-cooking package capable of cooking a food article by means of a microwave range, etc. without being tampered with at all after being purchased. Another purpose of the invention is to supply a pressure-regulating valve utilized for the above-mentioned automatic-cooking package. Yet another purpose of the invention is to supply a food article that is packaged in the above-mentioned automatic-cooking package and that can be cooked without being tampered with easily and conveniently at home, at work, at an eatery, on a train, on a plane, on a ship, etc.

[0005]

[Means for Solving the Problems] The present invention solves the above problem by means of an automatic-cooking package which comprises a flexible container having a hole in at least one location and a sheet-like pressure-regulating valve adhered so as to block said hole and in which said sheet-like pressure-regulating valve opens when the pressure inside said flexible container reaches a certain value.

[0006]

[Operation of the Invention] The targets of automatic-cooking packages

of the invention are mainly food articles. Examples of the food articles include fresh produces such as fishes and meats, frozen articles thereof, processed articles such as steamed bread and beef stews, frozen articles thereof, and other food and beverages. Automatic-cooking packages are equipped with the basic functions of conventional packages and are therefore not at all different from conventional packages during transportation, storage, display, etc. with the above-mentioned food articles sealed inside them.

[0007] Furthermore, an automatic-cooking package of the invention has a function of a cooking tool. A consumer who brings home an automatic-cooking package with a food article sealed in it can cook the food article by simply using a heat-generating cooking apparatus such as a microwave range. It is not necessary to open the automatic-cooking package or to make a hole in it. It is also unnecessary to use a cooking tool such as a pan or a frying pan.

[0008] When an automatic-cooking package heated by being placed inside a heat-generating cooking apparatus, moisture evaporates from the contained food article and increases the pressure inside the package, and the flexible container expands as a result. Through the hole, the pressure acts on the sheet-like pressure-regulating valve adhered to the flexible container. When the pressure inside the package exceeds a predetermined pressure, the sheet-like pressure-regulating valve becomes peeled off and reduces the internal pressure. When the pressure is reduced, the sheet-like pressure-regulating valve becomes adhered to the container again, and the pressure inside the container is kept at a constant level.



The pressure inside the container can be adjusted by selecting the adhesive force of the sheet-like pressure-regulating valve or the diameter of the hole.

[0009] The pressure-regulating valve consists of a flexible sheet and an adhesive applied to one side of said flexible sheet. The above-mentioned flexible sheet has an area that does not have an adhesive applied to it at the center of said one side, and said area free of the adhesive is noncircular. Moreover, it is desirable that the area free of the adhesive be an isosceles triangle with the apex angle being  $60^\circ$ .

[0010] The pressure-regulating valve is attached in a manner such that its adhesive-free area covers the hole of the flexible container. When the pressure inside the flexible container increases, its pressure also acts on the pressure-regulating valve. Since the adhesive-free area is noncircular, the pressure acts on it unevenly. For instance, if the adhesive-free area is an isosceles triangle as mentioned earlier, the pressure acts to peel off the adhesion from the sides of the isosceles triangle. Peeling of the adhesion starts from the hypotenuses which are relatively longer than the base and advances toward the apex. As the peeling of the adhesion progresses, a portion of the pressure-regulating valve becomes peeled off of the flexible container. However, its base remains attached to the flexible container. When the interior of the flexible container and the outside air come into contact with each other, the pressure inside the flexible container drops. After that, the pressure-regulating valve becomes reattached to the flexible container and maintains the internal pressure at a constant level.

[0011] Another pressure-regulating valve comprises a flexible sheet, an adhesive applied to one side of said flexible sheet, and a noncircular sheet piece attached to the center part of one side. It is desirable that this sheet be an isosceles triangle with the apex angle being  $60^\circ$ .

[0012] This pressure-regulating valve is attached in a manner such that the sheet piece covers the hole of the flexible container. When the pressure inside the flexible container increases, this pressure also acts on the pressure-regulating valve. Since this sheet piece is noncircular, a pressure caused by gas that leaks from the area between the flexible container and the sheet piece will act unevenly. For instance, if the sheet piece is an isosceles triangle as mentioned earlier, the pressure acts to peel off the adhesion from the sides of the isosceles triangle. Peeling of the adhesion starts from the hypotenuses which are relatively longer than the base and advances toward the apex. As the peeling of the adhesion progresses, a portion of the pressure-regulating valve becomes peeled off of the flexible container. However, its base remains attached to the flexible container. When the interior of the flexible container and the outside air come into contact with each other, the pressure inside the flexible container drops. After that, the pressure-regulating valve becomes reattached to the flexible container and maintains the internal pressure at a constant level.

[0013] Yet another pressure-regulating valve consists of a flexible sheet, an adhesive applied to one side of said flexible sheet, and a thread piece attached to the center part of one side.

[0014] This pressure-regulating valve is attached in a manner such that

the thread piece covers the hole of the flexible container. When the pressure inside the flexible container increases, the pressure also acts on the pressure-regulating valve. The pressure advances the peeling of the adhesion in parallel to the thread piece. As the peeling of the adhesion progresses, a portion of the pressure-regulating valve becomes peeled from the flexible container. When the interior of the flexible container and the outside air come into contact with each other, the pressure inside the flexible container drops. In this case, the pressure-regulating valve will keep decreasing the pressure inside the flexible container without becoming reattached.

[0015] By using the above automatic-cooking packages, various food articles can be packaged. It is even possible to normally package fresh produces. Moreover, it is possible to use the following structure. /4

[0016] It is possible to seal a small first package containing a cooking solution and a food article in a large second package and to display and sell them in that condition. When the entire second package is heated by means of a heat-generating cooking apparatus, the cooking solution inside the first package becomes boiled first. The pressure inside the first package increases, and the pressure-regulating valve becomes opened. The cooking solution inside the first package flows into the second package while boiling. The food article inside the second package becomes cooked directly inside the heat-generating cooking apparatus and the flexible container. If the cooking solution is water, a steamed item will be obtained, and if the cooking solution is soup or soup stock, a boiled and seasoned item will be obtained.

[0017] It is possible to seal an ice piece and a frozen food item inside a package and to display and sell them in that condition. When the entire package is heated by means of a heat-generating cooking apparatus, the ice piece melts into water, which then boils and turns into steam. The pressure inside the flexible container can be adjusted by means of a pressure-regulating valve, and the food becomes cooked at appropriate temperature and pressure. If the ice piece consists of mere ice, this article will be a steamed item. If a seasoning is contained in the ice piece, the ice piece will become soup or soup stock, and the food becomes seasoned at the same time as the heating. This product is suitable for boiling and seasoning an item.

[0018] It is possible to seal a small first package containing a non-freezing seasoning together with a food article and an ice piece in a large second package and to display and sell them in that condition. When the entire second package is heated by means of a heat-generating cooking apparatus, the seasoning inside the first package becomes boiled, the pressure inside the first package increases, and the pressure-regulating valve becomes opened. The cooking solution inside the first package flows into the second package while boiling. At the same time, the ice piece melts into water, which then boils and turns into steam. The seasoning and the water become blended so as to achieve a suitable concentration, and the food article inside the second package becomes cooked directly inside the heat-generating cooking apparatus and the flexible container. This invention is useful for cases in which the seasonings, such as concentrated soups, do not freeze. The concentration

can be adjusted by means of the sealed amount of the non-freezing seasoning or the sealed amount of the ice piece.

[0019]

[Embodiments of the Invention] In Figure 1, the reference numeral [10] is an automatic-cooking package. The automatic-cooking package [10] consists of a flexible container [11] and a sheet-like pressure-regulating valve [24]. The reference numeral [12] is the content. The flexible container [11] comprises a top-face sheet [18] consisting of a polyethylene sheet [14] on the inside and a polypropylene sheet [16] on the outside and a bottom-face sheet [20] consisting of a polypropylene sheet [16] as illustrated in Figure 2. The flexible container [11] is bag-shaped with the circumferences adhered to each other. The flexible container [11] has a hole [22] on one of its sides. A pressure-regulating valve [24] is adhered in a manner such that it blocks the hole [22].

[0020] Figure 3 and Figure 4 show an automatic-cooking package [10'] having another structure. This automatic-cooking package [10'] comprises a flexible container [11'] obtained by mutually adhering a top sheet [18'] and a bottom sheet [20'], each of which consists of a polyethylene sheet [14] on the inner side and a polypropylene sheet [16] on the outer side, at the circumferences. The pressure-regulating valve [24] is the same.

[0021] Figure 5 and Figure 6 illustrate the details of the hole [22] and the pressure-regulating valve [24]. The hole [22] is unlikely to receive concentrated stress because of its circular shape. The pressure-regulating valve [24] comprises a circular flexible sheet [26] and an adhesive [28] applied to one of its sides. In Figure 6, the area with diagonal lines

illustrates the region in which the pressure-regulating valve [24] is adhered to the flexible container [11] by means of an adhesive material (Hereafter, the diagonal lines in similar drawings indicate the same). The pressure-regulating valve [24] has provided to its center part an adhesive-free part [30]. It is preferred that the adhesive [28] be selected from among those that exhibit adhesive forces in the range between -20°C and 140°C. In this embodiment, UVCAT1300/S (Teikoku Printing Inks Mfg. Co., Ltd.) is utilized as the adhesive [28].

[0022] The adhesive-free part [30] is noncircular and is an isosceles triangle with the apex angle being 60° in the case of this embodiment. The adhesive-free part [30] has an area that covers the hole [22], and the hole [22] faces the adhesive-free part [30]. This structure keeps the content [12] from touching the adhesive and thus maintains food sanitation.

[0023] The automatic-cooking package [10] has a function of a cooking tool in addition to the conventional functions of a package. The operation will be explained by referring to Figure 7 through Figure 9.

[0024] Figure 7, (a), (b), and (c), illustrate a condition in which the automatic-cooking package [10] of Figure 1 having its content sealed in it has been heated for a while in a heat-generating cooking apparatus, such as a microwave range. The moisture of the content [12] evaporates into steam in response to heat radiation, and the pressure inside the flexible container [11] increases. There is no change in the pressure-regulating valve [24], and the pressure inside the flexible container [11] increases.

[0025] Figure 8, (a), (b), and (c), illustrate a condition in which, as a result of further heating, more moisture has turned into steam and in which the pressure inside the flexible container [11] has increased. The steam flows inside the flexible container [11] in a convective manner with part of it liquefying and accumulating at the bottom of the flexible container [11]. The pressure that increases gradually acts slowly on the pressure-regulating valve [24] through the hole [22], and the peeling of the adhesion starts. The peeling of the adhesion occurs at the hypotenuses [34] which are longer than the base [32].

[0026] Figure 9, (a), (b), and (c), illustrate a condition in which the pressure inside the flexible container [11] has increased even more. Since the adhesive-free part [30] is an isosceles triangle with the apex angle being  $60^\circ$  or less, the directionality and orientation of the peeling of the adhesion toward the apex angle are guaranteed.

[0027] Figure 10, (a), (b), and (c), illustrate a condition in which the pressure inside the flexible container [11] has exceeded a certain level and in which the pressure-regulating valve [24] has become peeled off. The pressure inside the flexible container [11] decreases. However, as illustrated, part of the pressure-regulating valve [24] remains attached to the outer surface of the flexible container [11]. When the pressure becomes less than a predetermined level, the pressure-regulating valve [24] becomes reattached to the flexible container [11].

[0028] The shape of the pressure-regulating valve [24] is not limited to circular. As illustrated in Figure 11, (a), (b), (c), (d), and /5 (e), it may instead be a square [24a], a triangle [24b], an oval [24c],

a rectangle [24d], or other polygons such as [24e]. Moreover, since the pressure-regulating valve [24] is adhered to the flexible container [11], it is preferred that its corners be rounded in order to keep concentrated stress from being applied to the flexible container [11].

[0029] Moreover, it is permissible for the shape of the adhesive-free part [30] of the pressure-regulating valve [24] to be T or a cross, although an isosceles triangle with an apex angle of  $60^\circ$  or less is desirable.

[0030] Figure 12, (a), (b), and (c), illustrate another example of a pressure-regulating valve. A pressure-regulating valve [124] of the present embodiment consists of a circular flexible sheet [126], an adhesive [128] applied to one of the sides of the flexible sheet, and a noncircular sheet piece [130] attached to the center part of one side. In the case of this embodiment, the sheet piece [130] is an isosceles triangle with an apex angle of  $60^\circ$  or less. The sheet piece [130] has an area that covers the hole [22] of the flexible container [11], and the hole [22] faces the sheet piece [130].

[0031] Figure 13, (a), (b), and (c), illustrate an example of another pressure-regulating valve. The pressure-regulating valve [224] of this embodiment consists of a circular flexible sheet [226], an adhesive [228] applied to one of the sides of the flexible sheet, and a thread piece [230] attached to the center part of one side in a manner such that it crosses the hole [22] of the flexible container [11]. The thread piece [230] has lengths that are laterally uneven with respect to the center of the hole [22]. The pressure-regulating valve [224] of this embodiment causes the peeling of the adhesion to advance in parallel to the thread



piece. In this case, the peeling of the adhesion advances markedly on the long side (leftward in the drawing). The pressure-regulating valve [224] of this embodiment does not reattach to the flexible container [11] after the adhesion has been peeled off and is therefore useful when only opening is required.

[0032] Figure 14, (a), (b), and (c), illustrate an example of another pressure-regulating valve. The pressure-regulating valve [324] of this embodiment consists of a circular flexible sheet [326], an adhesive [328] applied to one of the sides of the flexible sheet, and an adhesive-free part [330] that stretched all the way across one side in the diameter direction. The adhesive-free part [330] has a structure in which the flexible container [11] and the outside air are communicated with each other from the beginning. For example, two holes are provided to the flexible container, the pressure-regulating valve [324] is attached to one of the holes from the outside of the flexible container, and the pressure-regulating valve [324] is attached to the other hole from the inside of the flexible container. As a result, a package that allows for both suctioning and discharging of air is obtained.

[0033] Figure 15 ~ Figure 20 illustrate first ~ sixth embodiments of food articles packed in automatic-cooking packages. The packed food articles may be any articles such as fresh produces, frozen fresh produces, processed food articles, etc.

[0034] The content in the case of Figure 15 is corn. The automatic-cooking package is the one illustrated in Figure 3 and Figure 4, and the pressure-regulating valve is the one illustrated in Figure 5 and Figure

6. These can also be said about the following embodiments. The automatic-cooking package [110] has sealed in it a nonwoven fabric [113] in addition to the corn [112]. The nonwoven fabric [113] has a function of adjusting the water content inside the flexible container [111].

[0035] The food article illustrated in Figure 16 is noodles. The automatic-cooking package [110] has sealed in it noodles [200] and an automatic-cooking package [110a]. The automatic-cooking package [110a] has soup sealed in it. The directions of the pressure-regulating valves, [24] and [24], of the automatic-cooking package [110] and the automatic-cooking package [110a] are reversed.

[0036] When the automatic-cooking package [110] is placed and heated inside a microwave oven, the soup inside the small automatic-cooking package [110a] becomes heated and evaporate first, and the interval pressure becomes increased. Then, the pressure-regulating valve [24] becomes peeled off, and the soup flows into the automatic-cooking package [110]. Since the pressure inside the automatic-cooking package [110a] keeps increasing, all of the soup flows into the automatic-cooking package [110]. When heating is further continued, the soup boils inside the automatic-cooking package [110] and boils the raw noodles. At this time, the pressure-regulating valve [24] adjusts the pressure inside the automatic-cooking package [110].

[0037] After heating has been carried out for a predetermined period of time, the automatic-cooking package [110] is opened and the content is transferred to a dish, such as a bowl. In this manner, the preparation of the noodles is finished. It is also permissible to include fillings,

such as onions and roast pork, in the automatic-cooking package [110]. Since no cooking tool is utilized, the preparation is extremely simple and convenient.

[0038] The food article shown in Figure 17 is raw fish, which is fresh produce. The automatic-cooking package [110] has sealed in it raw fish [202] and an automatic-cooking package [110b]. Soup stock is sealed in the automatic-cooking package [110b]. The directions of the pressure-regulating valves, [24] and [24], of the automatic-cooking package [110] and the automatic-cooking package [110b] are reversed.

[0039] Explanation of its cooking method will be omitted since it is the same as that of the embodiment illustrated by referring to Figure 16.

[0040] The content in Figure 18 is steamed bread. The automatic-cooking package [110] has a bread dough [204], an ice piece [206], and a nonwoven fabric [208] sealed in it. When the automatic-cooking package [110] is placed and heated inside a microwave oven, the ice piece [206] becomes melted into water, which then becomes heated and turns into steam. The steam then cooks the bread dough [204]. After further heating, the pressure-regulating valve [24] becomes peeled off, and the pressure inside the automatic-cooking package [110] becomes adjusted.

[0041] The content in Figure 19 is frozen fish. The automatic-cooking package [110] has the frozen fish [210] and an ice piece [212] containing a seasoning sealed in it. The ice piece [212] is packed in a nonwoven fabric [213]. When the automatic-cooking package [110] is placed and heated inside a microwave oven, the ice piece [212] becomes melted and then boils in response to heating. The fish [210] becomes cooked. The

pressure-regulating valve [24] becomes peeled off, and the internal pressure of the automatic-cooking package [110] becomes adjusted.

[0042] The content in Figure 20 is beef stew. The automatic-cooking package [110] has a filling [214], an automatic-cooking package [110c] containing a non-freezing seasoning [216] sealed in it, and an ice piece [218] sealed in it. When the automatic-cooking package [110] is placed and heated inside a microwave oven, the non-freezing seasoning [216] flows out of the automatic-cooking package [110c] and, at the same time, the ice piece [218] becomes melted and turns into soup. The pressure-regulating valve [24] becomes peeled off, and the internal pressure of the automatic-cooking package [110] becomes adjusted. /6

[0043] In the above manner, according to the invention, various types of food items can be cooked by simply heating them by means of a heat-generating cooking apparatus, such as a microwave oven, without using any cooking tool. Its purposes are not limited to household usages and can be expanded to cooking at workplaces, on trains, on airplanes, and on ships and also even to eateries.

[0044]

[Effects of the Invention] An automatic-cooking package of the invention of Claim 1 has the functions of a conventional package as well as an additional function of a cooking tool. Therefore, from the standpoint of the handlers of the package (e.g. food article manufacturers, food article distributors), it is possible to substantially increase the commercial value by replacing a conventional package with a package of the invention. From the standpoint of consumers of the food articles (e.g.

final consumers in households), an automatic-cooking package of the invention, which allows for cooking by means of only a heat-generating cooking apparatus such as a microwave oven, has remarkable effects unattainable from a conventional package, and they include the facts that the preparation is simple and convenient, that the trouble of cooking can be skipped, and that cooking tools will not become dirty. From the standpoint of other consumers, such as those who professionally supply food items as in the case of eatery owners, it is possible to provide food items only in necessary quantities whenever they are needed. What is particularly important is that the food hygiene is maintained since the handlers of the food articles do not have an opportunity to touch the food articles.

[0045] Furthermore, a pressure-regulating valve guarantees a cooking environment appropriate for the contained food item. From among the elements of a cooking environment, the pressure inside the package has a subtle influence on the taste of the food item. Since an automatic-cooking package of the invention maintains a constant pressure, it is possible to allow for the natural flavors of the raw materials, particularly if the food items are fresh produces such as fishes or meats.

[0046] According to a pressure-regulating valve of Claim 2 or 4, the shape of the adhesive-free part is noncircular. Since a pressure acts unevenly on the pressure-regulating valve, the peeling of the adhesion advances with directionality and orientation. When the adhesion is peeled, a portion of the pressure-regulating valve becomes held on the flexible container. The peeling of the adhesion occurs only when the pressure reaches a

predetermined level or higher, and the adhered state is restored when the pressure becomes less than the predetermined level. In this manner, since a ventilation state and a non-ventilation state alternate, the pressure inside the flexible container is kept at a constant level, and a pressure appropriate for the preparation of the food article can be maintained. Moreover, since part of the pressure-regulating valve is always adhered to the flexible container, the pressure-regulating valve will not blend in with the food article.

[0047] According to a pressure-regulating valve of Claim 3 or 5, its adhesive-free part has a shape most appropriate for the peeling of the adhesion and for the directionality and orientation thereof.

[0048] According to a pressure-regulating valve of Claim 6, part of the adhesive applied to one side of the flexible sheet is provided with a thread piece that is stretched over a hole. When a pressure of a predetermined level or more acts on the pressure-regulating valve, the peeling of the adhesion advances in parallel to the thread piece, eventually causing the interior of the flexible container and the outside air to be communicated with each other. Since the adhered state of this pressure-regulating valve will not be restored, it is useful for cases in which the internal pressure of the flexible container is allowed to keep decreasing.

[0049] A food article of any one of Claim 7 through Claim 10 has been appropriately packaged in accordance with its kind and cooking method.

[0050] A food article of Claim 7 has a structure for steamed or boiled item and is useful for cases in which the contents are fresh produces.

For example, it is suitable when the content is a bread dough and steamed bread is prepared with it, the content is fish and boiled fish is prepared with it, or the content is noodles and warm noodles are prepared with them. Since a heat-generating cooking apparatus such as microwave oven acts on the water content, the water content necessary for steaming or the cooking solution necessary for boiling starts boiling first and flows from the first package to the second package. The food item becomes cooked by the boiling water, steam, or cooking solution. Since all ingredients necessary for cooking have been sealed in just proportion and the cooking method will not vary among the consumers, it is possible to obtain cooked articles that have uniform tastes and that have been uniformly prepared. After the preparation, it is only necessary to open the second package and to transfer the cooked food item to a dish, such as a plate. Therefore, no cooking tool is required.

[0051] In the same manner as a food article of Claim 7, a food article of Claim 8 or 9 has a structure for steamed or boiled item, but it is structured for a frozen food item. By having a structure for a frozen item, it can seal moisture in a frozen state together with the content. Since all ingredients necessary for cooking have been sealed in just proportion and the cooking method will not vary among the consumers, it is possible to obtain cooked articles that have uniform tastes and that have been uniformly prepared. After the preparation, it is only necessary to open the second package and to transfer the cooked food item to a dish, such as a plate. Therefore, no cooking tool is required. The water content can be regulated by adjusting the amount of the ice piece.

[0052] From among those that have structures for frozen food items, a food article of Claim 10 is suitable when a non-freezing seasoning is required. For example, it is suitable for beef stew, which requires concentrated soup. Since all ingredients necessary for cooking have been sealed in just proportion and the cooking method will not vary among the consumers, it is possible to obtain cooked articles that have uniform tastes and that have been uniformly prepared. After the preparation, it is only necessary to open the second package and to transfer the cooked food item to a dish, such as a plate. Therefore, no cooking tool is required. The water content can be regulated by adjusting the amount of the ice piece.

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[Brief Explanation of the Drawings]

[Figure 1] A cross-sectional drawing of an automatic-cooking package of the invention in which a content is sealed.

[Figure 2] A magnified cross-sectional drawing of an end part of the automatic-cooking package of Figure 1.

[Figure 3] A cross-sectional drawing of an automatic-cooking package of another structure of the invention.

[Figure 4] A magnified cross-sectional drawing of an end part of the automatic-cooking package of Figure 3.

[Figure 5] A magnified cross-sectional drawing of an essential part near the pressure-regulating valve of the automatic-cooking package of Figure 1.

[Figure 6] A top-view drawing of Figure 5.

[Figure 7] The automatic-cooking package of Figure 1 observed immediately



after heating was started by means of a heat-generating cooking apparatus.

(a) is a cross-sectional drawing of the automatic-cooking package, (b) is a cross-sectional drawing of the vicinity of the pressure-regulating valve, and (c) is a plan-view drawing of the pressure-regulating valve.

[Figure 8] The automatic-cooking package of Figure 1 observed some time after heating was started by means of a heat-generating cooking apparatus.

(a) is a cross-sectional drawing of the automatic-cooking package, (b) is a cross-sectional drawing of the vicinity of the pressure-regulating valve, and (c) is a plan-view drawing of the pressure-regulating valve.

[Figure 9] The automatic-cooking package of Figure 1 observed after even more heating was carried out since the condition of Figure 8. (a) is a cross-sectional drawing of the automatic-cooking package, (b) is a cross-sectional drawing of the vicinity of the pressure-regulating valve, and (c) is a plan-view drawing of the pressure-regulating valve.

[Figure 10] The automatic-cooking package of Figure 1 observed after even more heating was carried out since the condition of Figure 9 and after the adhesion of the pressure-regulating valve became peeled. (a) is a cross-sectional drawing of the automatic-cooking package, (b) is a cross-sectional drawing of the vicinity of the pressure-regulating valve, and (c) is a plan-view drawing of the pressure-regulating valve.

[Figure 11] (a), (b), (c), (d), (e), and (f) are plan-view drawings showing the pressure-regulating valves having various other shapes.

[Figure 12] With respect to another pressure-regulating valve, (a) is a cross-sectional drawing observed along the a-a line of (b), (b) is a plan-view drawing, and (c) is a cross-sectional drawing observed along

the c-c line of (b).

[Figure 13] With respect to yet another pressure-regulating valve, (a) is a cross-sectional drawing observed along the a-a line of (b), (b) is a plan-view drawing, and (c) is a cross-sectional drawing observed along the c-c line of (b).

[Figure 14] With respect to yet another pressure-regulating valve, (a) is a cross-sectional drawing observed along the a-a line of (b), (b) is a plan-view drawing, and (c) is a cross-sectional drawing observed along the c-c line of (b).

[Figure 15] A cross-sectional drawing of the first embodiment illustrating a food item packed in an automatic-cooking package of the present invention. (a), (b), (c), and (d) illustrate the series of changes that occur in the automatic-cooking package, pressure-regulating valve, and food item as heating advances.

[Figure 16] A cross-sectional drawing of the second embodiment illustrating a food item packed in an automatic-cooking package of the present invention. (a), (b), (c), and (d) illustrate the series of changes that occur in the automatic-cooking package, pressure-regulating valve, and food item as heating advances.

[Figure 17] A cross-sectional drawing of the third embodiment illustrating a food item packed in an automatic-cooking package of the present invention. (a), (b), (c), and (d) illustrate the series of changes that occur in the automatic-cooking package, pressure-regulating valve, and food item as heating advances.

[Figure 18] A cross-sectional drawing of the fourth embodiment

illustrating a food item packed in an automatic-cooking package of the present invention. (a), (b), (c), and (d) illustrate the series of changes that occur in the automatic-cooking package, pressure-regulating valve, and food item as heating advances.

[Figure 19] A cross-sectional drawing of the fifth embodiment illustrating a food item packed in an automatic-cooking package of the present invention. (a), (b), (c), and (d) illustrate the series of changes that occur in the automatic-cooking package, pressure-regulating valve, and food item as heating advances.

[Figure 20] A cross-sectional drawing of the sixth embodiment illustrating a food item packed in an automatic-cooking package of the present invention. (a), (b), (c), and (d) illustrate the series of changes that occur in the automatic-cooking package, pressure-regulating valve, and food item as heating advances.

[Explanation of the Reference Numerals]

[10], [10'], [110], [110a], [110b] = automatic cooking package

[11], [11'], [111] = flexible container

[12], [112], [200], [202], [204], [210], [214] = content

[22] = hole

[24], [24a], [24b], [24c], [24d], [24e], [24f], [124], [224], [324] =  
pressure-regulating valve

[26], [126], [226], [326] = flexible sheet

[28], [128], [228], [328] = adhesive

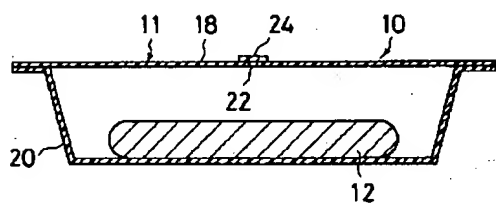
[30], [330] = adhesive-free part

[130] = sheet piece

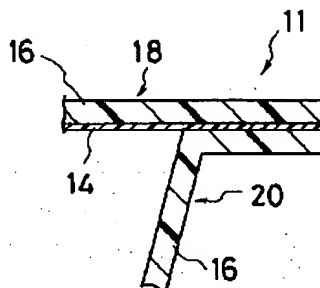
[206], [212], [218] = ice piece

[230] = thread piece

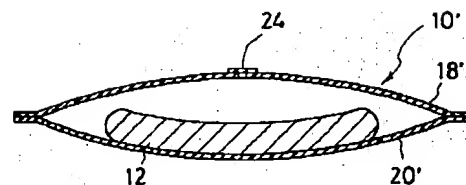
[Figure 1]



[Figure 2]

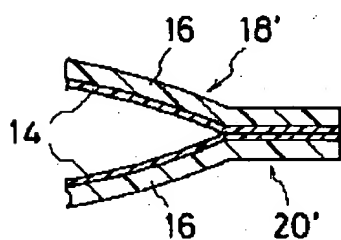


[Figure 3]

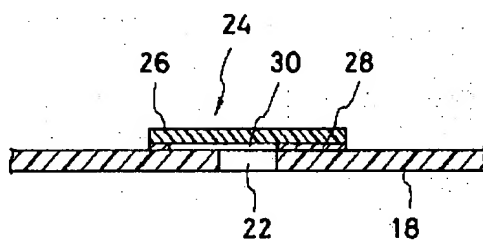


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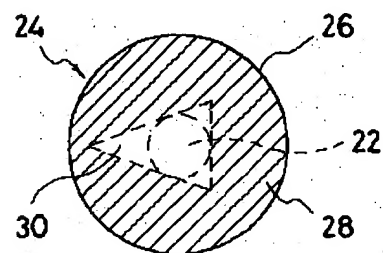
[Figure 4]



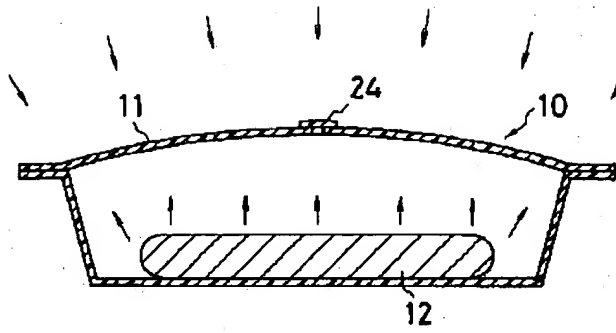
[Figure 5]



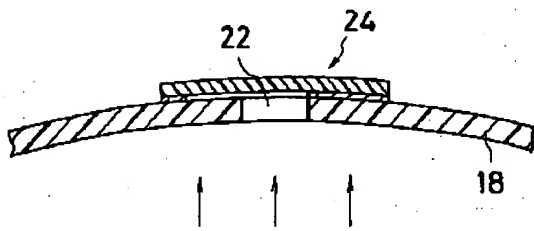
[Figure 6]



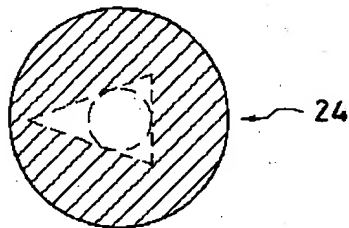
[Figure 7]



(a)

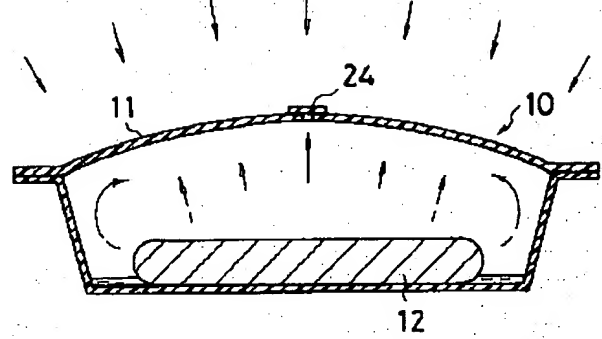


(b)

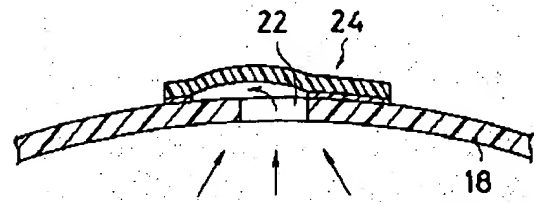


(c)

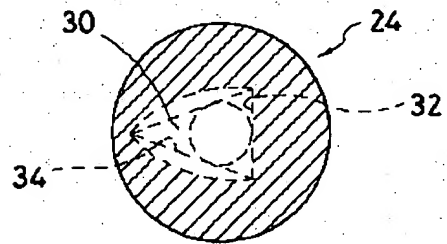
[Figure 8]



(a)

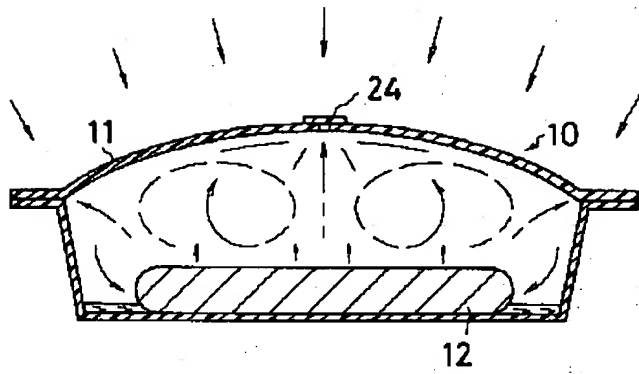


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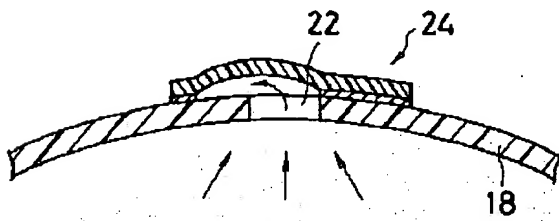


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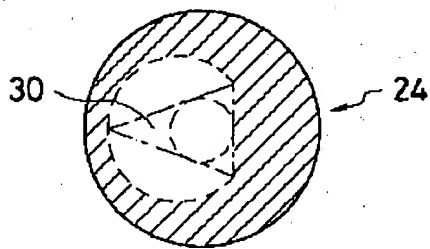
[Figure 9]



(a)



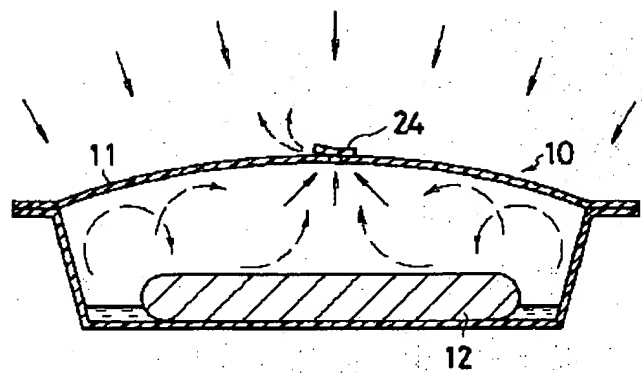
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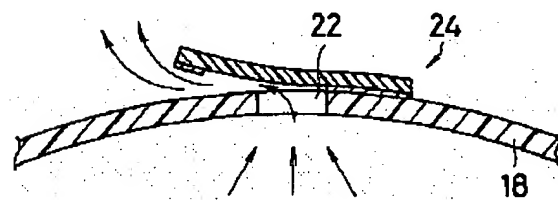
(c)

[Figure 10]

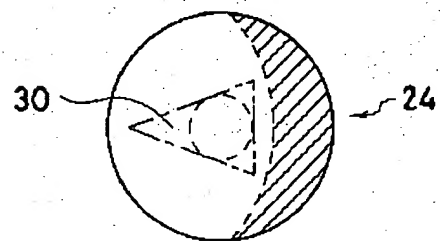
/9



(a)

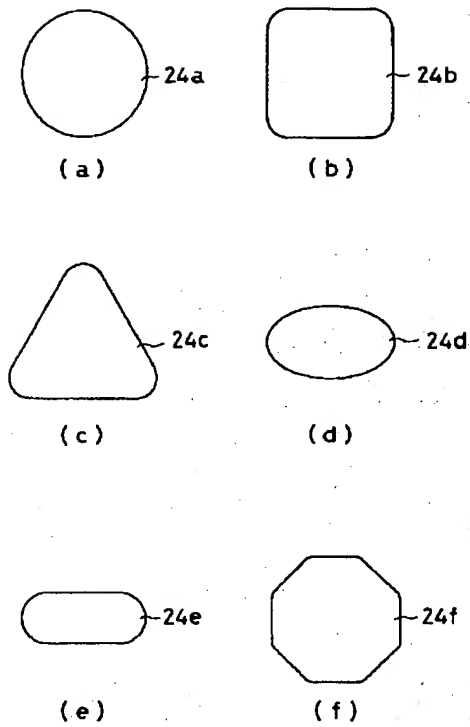


(b)



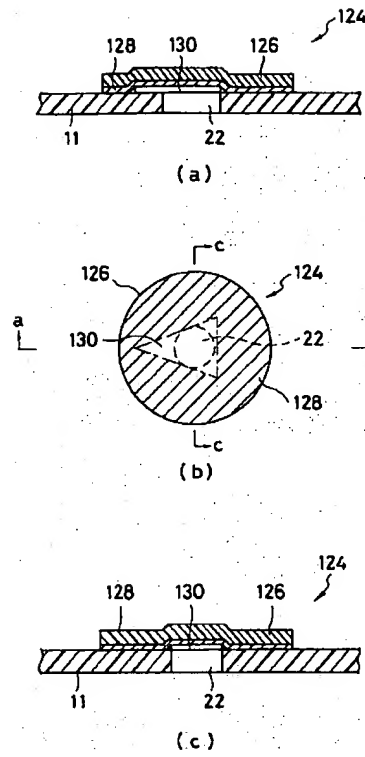
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[Figure 11]

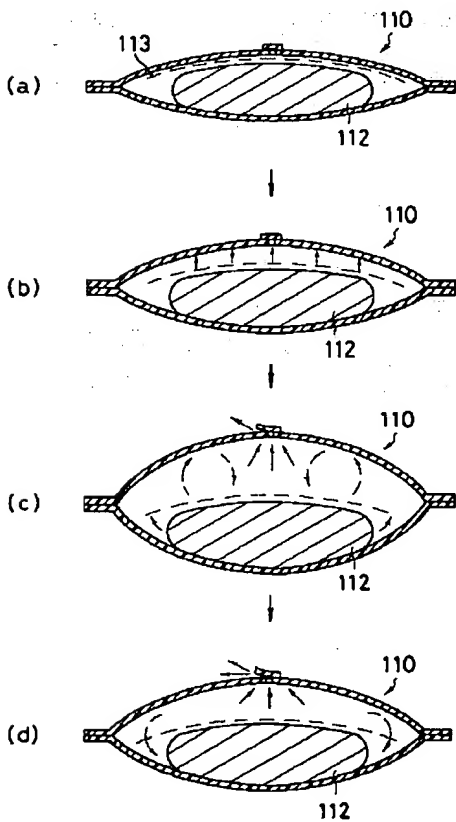


[Figure 12]

/10



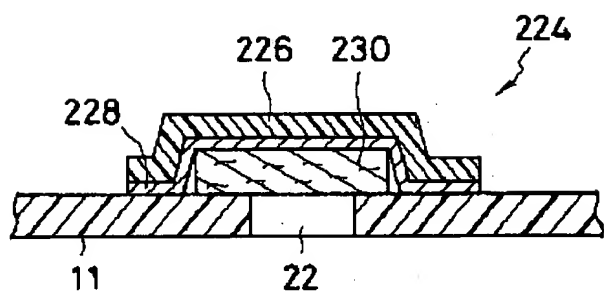
[Figure 15]



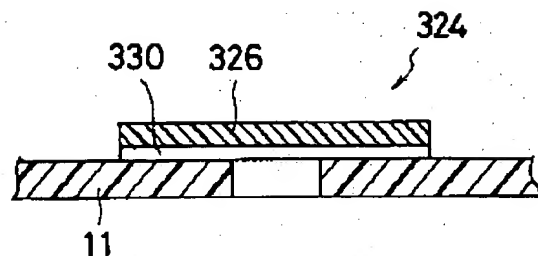
[Figure 13]

[Figure 14]

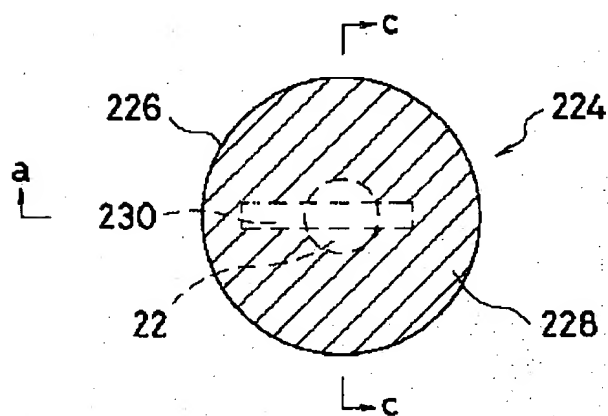
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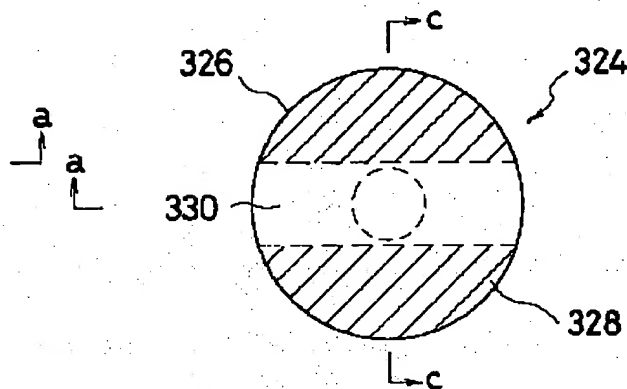
(a)



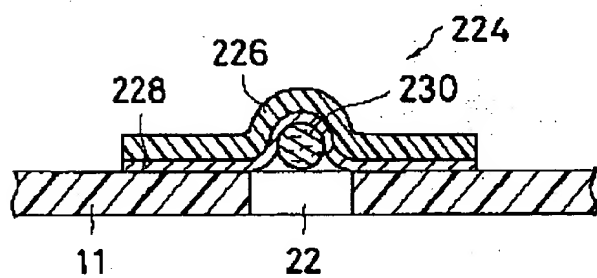
(a)



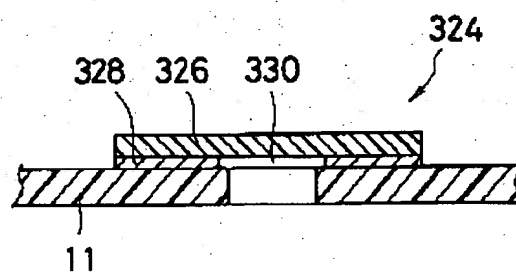
(b)



(b)



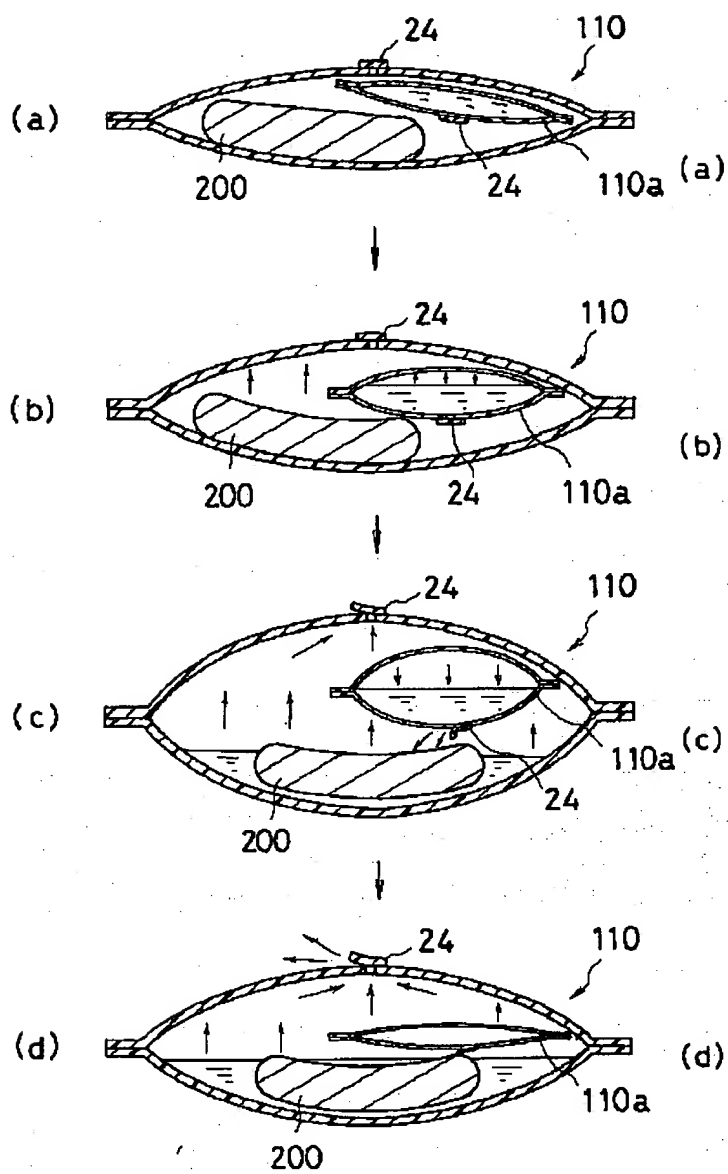
(c)



(c)

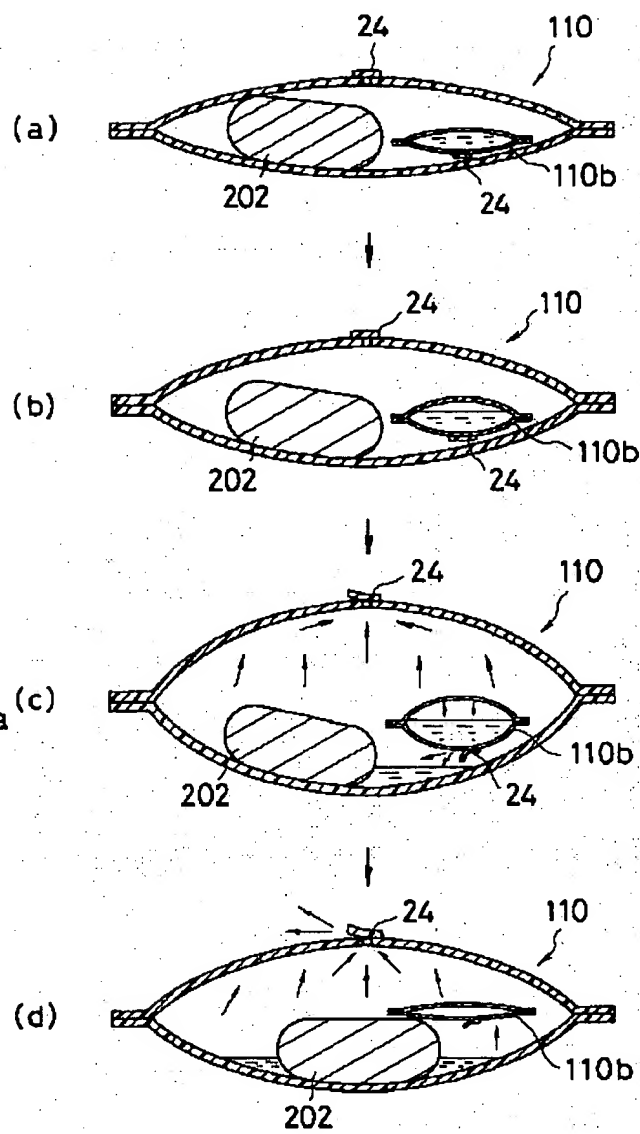


[Figure 16]

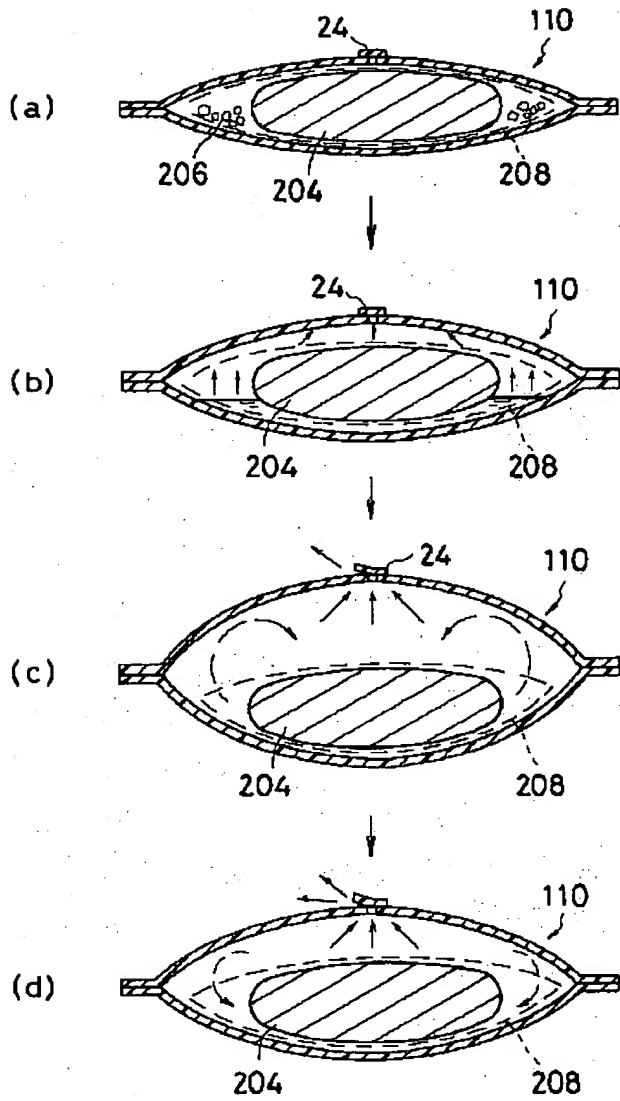


[Figure 17]

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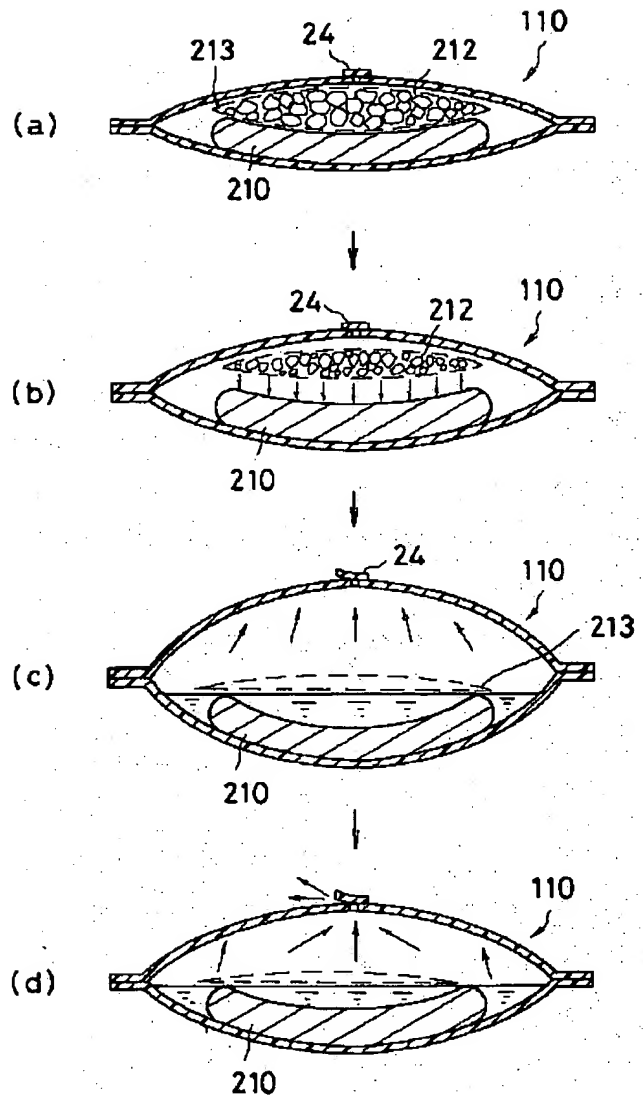


[Figure 18]



[Figure 19]

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[Figure 20]

